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ABSTRACT

The first half of this document examines the relationships between painting, poetry, and science, describing in particular their increasing focus on letters and typography. The poets and painters of mid-nineteenth century France, the Futurist school, and the Lettrist movement are discussed. Their common assumption, fundamental to modern typographic practice, is that letters of different typefaces have atmospheric value: the very form and shape of the letters contributes to the connotative meaning of a text. The second half of the document reports on research into the effects of different typefaces on the meaning of poetry. Four poems were printed in four very different typefaces; faces were chosen for their suitability to the poems' predominant themes and were interpreted by over 200 college students. The results showed that, contrary to the original hypothesis, the atmospheric value of the typeface contributes little or nothing to the connotative meaning of the text. The strong appeal to the senses generated by texts that are gracefully printed, carefully designed and decorated with illustrations, however, must still be acknowledged. Poets, painters, and scientists can continue their important interaction by becoming involved in the future possibilities of typographic design. (CC)

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Painting, Poetry, and Science

by David W. Seaman

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"Il faut que notre intelligence s'habitue à comprendre synthético-idéographiquement au lieu de analytico-discursivement."

--Guillaume Apollinaire

In studying the relations between painting, poetry, and science, especially as expressed over the last hundred years, I have found that the common ground which they share and keep returning to is typography. In poetry, this proceeds naturally from the poet's need for expression in language, but in painting and science the motivation comes less from necessity than as a result of interest in design and principles of physics.

Poetry and science as concepts embody more than rhymed language on the one side, and test tubes and formulas on the other. These banal stereotypes obscure a broader view of human experience, where we can understand poetry as the vehicle for intuitive, personal, artistic, emotional expression, while science represents concrete, rational, objective, and organized expression. The more familiar manifestations of these concepts should not be confused with the stereotypes: poetic expression leads to printed or spoken poems, and scientific expression leads to technology.

In this context, painting often stands as the intermediary, a means of expressing human experience which partakes of both the poetic, because

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of its artistic conception, and the scientific, because of its existence in organized concrete form. Typography, we shall see, is similar to painting in its attempt to mediate between poetry and science. The goal of both painting and typography is to render the abstract in concrete form.

We should not generalize too much at this point, however, for there is a history of different approaches to typography, and several kinds of relationships between painting, poetry, and science that we must examine first. Then, in a later section of this paper, I will discuss some typographic research which investigates the implicit hypothesis that grows out of the historical study.

I. Cross-Disciplinary Collaborations

When innovative minds of the nineteenth century became enthusiastic about synaesthesia, the results were concentrated in the arts, but science and technology gradually gained acceptance as part of the creative process.

Baudelaire's famous sonnet, "Correspondances," written in 1855, insists on the interrelations of sounds, colors, and odors, but as part of a symbolic expression of nature:

> La Nature est un temple ou de vivants piliers
> Laissent parfois sortir de confuses paroles;
> L'homme y passe à travers des forêts de symboles
> Qui l'observent avec des regards familiers.
>
> Comme de longs echos qui de loin se confondent
> Dans une ténébreuse et profonde unité,
> Vaste comme la nuit et comme la clarté,
> Les parfums, les couleurs, et les sons se répondent.

Baudelaire's ideas here are related to a widespread conception held by German romantics, including the philosopher Schelling, and writer E.T.A. Hoffmann, who used similar language in his "Kreisleriana," which Baudelaire admired.

With Arthur Rimbaud's "Voyelles," written in 1872, the poet characterizes himself as an alchemist--part priest, part scientist--in order to discover the latent origins of the letters of the alphabet that evoke sounds, colors, and rich imagery:

> A noir, E blanc, I rouge, U vert, O bleu: voyelles,
> Je dirai quelque jour vos naissances latentes:

In a more carefully argued explanation of synaesthetic relations, René Ghil's theory of "instrumentation verbale," developed in the 1880's and 1890's, purports to be the result of the poet's own scientific philosophy, based on contemporary research into the nature of color and sound. The result was a proposal that every sound in our speech is accompanied by specific associations of color and musical instrumentation.

The first evidence of experiments in synaesthesia which result from direct and active collaboration between science and art also occurs during this period, and involves the scientist Charles Henry, painter Paul Signac, and poets Gustave Kahn and Jules Laforgue.

Several of Henry's treatises investigate the esthetics of color and form, and he gave public demonstrations of his theories, with the collaboration of the painter Signac. In his theory of lines, Henry determines that pleasant lines are those which demand a minimum of effort

in their perception, while those which require more effort are painful. The "cycles" figured below are examples of pleasant (Figure 1) and inhibitive (Figure 2) lines.

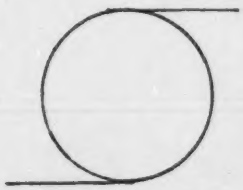

Figure 1

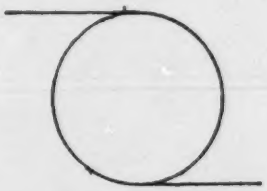

Figure 2

At the conclusion of his Introduction à une esthétique scientifique, Henry stresses the general application of his principles to all sciences and arts. Signac demonstrates the use of lines in his complex painting, "Against the Enamel of a Background Rhythmic with Beats and Angles, Tones and Colors, Portrait of M. Félix Fénéon in 1890." Georges Seurat applied the same theories to several of his well-known canvasses, and eventually published his own version of the aesthetic principles of lines. Signac experimented with Henry's theories of color and lines to make the advertisement for the Théâtre Libre shown in Figure 3.

The most direct literary application of Henry's theories is in typography. The pleasure or inhibition produced by lines can show up in the shape of certain individual letters as well as in the atmosphere value of different typefaces. Art critic Fénéon, subject of Signac's portrait, coined the word "Cucurbitant" to describe a pastel by Degas, where a woman is bathing in a tub, and he justified the neologism on the basis of the shape of the letters in it: the c's and u's suggest the roundness of the tub and the woman's figure.

Jules Laforgue and Gustave Kahn, friends of Henry, carried on discussions of which typeface to use for certain words in their poetry, considering the use of Italics and Gothic letters as alternatives to the ordinary Roman typefaces. Much of the atmosphere of these typefaces relates to the principles of lines enunciated by Henry. These principles are extended by Laforgue to include the alignment of margins in poetry, where he felt the eye picked up the rhythm.

This is a unique relationship between painters, poets, and scientists. The mutual experiences of creative people in an age of developing scientific technology might have led both painters and poets to make these experiments independently, but the explicit relationship described here demonstrates the artists' willingness to share their discoveries. The role of the third party--science--is intriguing, because it may have enabled painter and poet to extrapolate the general principles before applying them to their work, resulting in unusually similar techniques in the two genres.

The significance of the collaboration described here is that it shows creative people who have little sense of any separation between poetry, painting, and science. At this stage, the image of science as a technological master does not trouble the consciousness of either poet or painter, and the scientist is not embarrassed by his association with art.

II. Technology Enters the Scene

In the twentieth century, poets and painters became more aware of scientific technology, and while many resisted the unnatural side of

science, others saw possibilities, even imperatives for cooperation. The statement by Apollinaire at the head of this paper, that we must learn to think "synthetico--ideogrammatically," shows an understanding that seems to anticipate the instant communications of radar and computer technology.

The encroachment of technology on all aspects of culture is suggested in Siegfried Giedion's book, Mechanization Takes Command. One of Giedion's examples which demonstrates the connection to the arts is in the experiments of Frank Gilbreth, an American engineer. In a series of studies in the early 1900's, Gilbreth made studies of the physical motions in human activities. His findings add another dimension to the psychological implications of Charles Henry's theories. Gilbreth attached lights to the limbs of people engaged in various activities--bricklayers, fencers, surgeons--and through long photographic exposures was able to record the lines of motion involved in their tasks. These so-called "chronocyclographs" were then transformed into wire models that seem like sculptures.

There are several tempting comparisons to make between Gilbreth's wire models and the avant-garde art of that period. Giedion mentions Paul Klee and Joan Miro, who come to mind because of their use of lines. Indeed, the abstract compositions of Miro seem to reflect Gilbreth's interest in fluid motion. The artist confirms the scientist's discovery that efficient action must follow graceful lines.

A different kind of comparison is with Marcel Duchamp's "Nude descending a staircase," which is in its own way a motion study, suggesting through superimposed images the flow of action. There are also parallels between

Gilbreth's wire models and the wire sculptures done later by such artists as Alexander Calder, who captured, in a similar fashion, lines of action both in stable and mobile forms.

These examples from art reveal the essence of Gilbreth's scientific research, partaking of a spirit of the times that is expressed by both the scientific research and artistic creativity. It would be impossible to establish conscious, direct influences in all cases of artists who participate in a general trend, such as this abstraction of human motions into linear designs; we must acknowledge the strength of the Zeitgeist to communicate conceptions such as Gilbreth's presenting new visions of everyday gestures and actions.

Within the time period we are now examining--during and after World War One, the Futurists, a school of poets and painters in France and Italy, do explicitly identify their debt to science. Indeed, the Futurists welcomed technology, and attempted to introduce elements of it into their poetry and painting in order to signal a new era in the arts. Filippo Tomasso Marinetti, author of the initial Futurist Manifesto, declared: "Literature has hitherto glorified thoughtful immobility, ecstasy and sleep; we shall extol agressive movement, feverish insomnia, the double quick step...." Marinetti's program included a "typographic revolution," which did not merely oppose the cluttered and ornamented style of printing we associate with old books; he wanted to go far beyond this into a dazzling page composition corresponding to his own Futurist ideas of art. Thus, having observed in his world an acceleration of life and abhorrence of peaceful existence, he was against any typographical harmony. To break

up the typographical harmony of the page, he suggested using three or four different colors, and as many as twenty different type faces.

Marinetti felt that this free expressive typography (his phrase) imitated the expressions of the face, and the gestures of a story-teller. In this way, the visual typographic composition of the poet is related to the paintings by other Futurists. Umberto Boccioni, sculptor, painter, and sometime poet, wrote about the "lines of force" in his painting, referring to the directions of lines, which he viewed, along with color and solid forms, as the sole elements of dynamic expression. In discussing a pair of paintings where he depicts "Arrival" and "Departure," Boccioni declares that since the two concepts are so different, there is not a single line in the one canvas that occurs in the other. This emphasis on the evocative powers of lines, and the discovery of different lines for different actions and moods, connects Boccioni not only to Gilbreth, but also to Charles Henry.

Another element of Marinetti's poetics reveals a more direct attachment to technology: It is what he termed "geometric and mechanical splendor." One technique for attaining such splendor was the inclusion of numbers and mathematical signs in his compositions, where they were supposed to give a feeling of space and precision. The poem (or "parolibero," as he preferred to call them) in Figure 4, entitled "Après la Marne, Joffre visita le front en auto," is a good illustration of Futurist typography. It is composed of words in different styles and sizes of type, numbers, signs, and giant curving lines and jagged capital letters at all angles, suggesting the violent spectacle of a battle on land and in the air.

The Futurist achievements in typography were crucial to the development of avant-garde poetry, representing a liberation of the word and the letter from their traditional bonds; moreso than any previous effort, they expand the use of space on the page and proclaim the visual power of letters. The new attitude was expressed in this way by Futurist critic Ardengo Soffici:

> No longer a mute conventional sign, but a living form among other living forms, the letter can become an integral part of the medium of representation.

While the Futurists arrived at a new typography through absorbing and imitating technology, a later movement, called Lettrism, came to a similar belief without direct reference to science. Isidore Isou, founder of the Lettrist school, developed his ideas while living in his native Romania during World War II. Eventually he went to Paris, joined with Maurice Lemaître, his principal associate, and began publishing treatises on Lettrist art.

Isou and Lemaître believed that both painting and poetry were in need of renewal in order to survive. This sense of reconstruction can be observed as an artistic phenomenon that often follows major warfare, especially when, as in the case of the two World Wars, the destruction of past monuments is accompanied by technological advances. Unlike the Futurists, however, the Lettrists eschewed technology, and returned to an understanding of the artist as seer, much closer to Rimbaud's conception.

According to the Lettrists, words had to be broken down into letters in order to rebuild the world of poetry. As a corollary, painting, having

exhausted all the possibilities of representational and non-objective form, required letters to refresh its impact. The principal form of Lettrist art is Hypergraphics, a visual medium which usually combines letters and representational forms (photographs, portraits, etc.). Hypergraphics are considered by Isou and Lemaitre to be a superior form of expression, because of the greater impact of letters on the consciousness. They demonstrate this idea by suggesting that any fragment of representational art in a non-objective work attracts our attention--we grasp at what is familiar. Similarly, a letter on any art work has greater drawing power. The result is to elevate typography alone--whether part of a coherent message or not--to a position of prominence as an expressive art form.

The accompanying illustration, a page from a hypergraphic "novel," shows also the Lettrist fascination for ciphers (see Figure 5). This coded story is written in a language which, like the expressions of computer technology, needs a special skill to decipher. The composite design of the page also reminds one of Apollinaire's admonition to think ideogrammatically, since the whole page is a unified figure, to be read as a whole and not in linear order.

The Lettrist movement appropriately concludes this section of the paper, because it stands as a culmination of the increased focus on letters and typography that we have been examining. This movement also brings into the open an assumption that not only underlies the poetry we have discussed, but is also fundamental to modern typographic practice. The assumption may be stated in this way: Letters, presented in different typefaces, have not only a denotative, semantic function in expressing language, but they also contribute to the connotative meaning of a text through their

semiotic form. This aspect of typography is called atmosphere value.

III. Typographic Atmosphere Value

Many poets, even beyond those discussed above, have fussed over the typographic setting of their poems. Stéphane Mallarmé researched typefaces in preparation for printing his masterpiece, Un Coup de Dés; Walter de la Mare made an address on the subject of the printing of poetry, and so forth. In support of this belief in atmosphere value, typographers have made recommendations about which typeface is appropriate for various subject matter, following an unwritten rule that there is a correspondence between content and visual form. The specific workings of this rule are so vague, however, that a typographer can freely make his own suggestions. For example, one author identifies the boldface Ultra Bodoni for advertising trucks, while the delicate Egomont Light is proper for "feminine subject matter." If that is true, then what of poems about trucks, or containing feminine subject matter (whatever that is)? Do they require the proper typeface, or could the wrong typeface alter the meaning?

Previous research on the atmosphere value of typefaces has sought to determine how a typeface might be classified, based on the image it projects. What I sought with my research was an answer to the question of what effect the typeface might have on the actual meaning of poetry.

The influence of typography on meaning should be observable in poetry, since poetry depends to such a great extent on connotative variations.

The present experiment was designed so that subjects would read and interpret the same poems, printed in four different typefaces. Each subject saw only one typeface, so that no one was aware that typography was a factor--the test was ostensibly on the interpretation of poetry. However, any measurable differences in interpretation between the typeface groups would have to be attributed to the subtle, connotative influence of the atmosphere value of the different typefaces. Samples of the poems and typefaces are illustrated in Figures 6 through 9.

Four poems were carefully chosen to contain certain ambiguities which might allow for indirect influences. One came from the poems used by I. A. Richards in Practical Criticism, his monumental study of how people interpret poetry. The others were selected with similar intent, and with the aim of representing a variety of major themes: death, love, grandeur, humor. The poems are lesser known works by reputable poets, and were presented without author or title. They are "George Meredith," by Thomas Hardy; "Love in the Valley," by George Meredith; "A Lament," by Percy Bysshe Shelley; "It Isn't" by Melville Cane.

Selection of typefaces was made after careful consideration of previous research. It was desirable to avoid outlandish typefaces, keeping to those which might conceivably be used to print poetry. At the same time, the typefaces had to be significantly different. Preference went to faces which might "naturally" be associated with the predominant themes in the poems, increasing the likelihood of unconscious matching by subjects. The following linotype faces were chosen: Baskerville Roman (a "standard" face), De Vinne Italic (the most cursive available, suggesting feeling,

love, etc.), Futura medium condensed (rigid and straight, strongly associated with death in some findings), and News Gothic (orderly, prosaic). The poetic texts were printed by the La Salle Street Press, Chicago; printing was made possible through the generosity of Elliott Donnelley of the Lakeside Press, Chicago.

Experiment packets of the four poems, accompanied by appropriate questionnaires, were distributed to over 200 college students in literature classes, performing the experiment in controlled settings. Questionnaires included both specific questions about the poems, and evaluations of the poems by a scale of semantic differentials.

The purpose of the specific questions was to force decisions on certain ambiguous aspects of the poems, in order to discover whether the typeface would influence the interpretation of those passages. For example, in question 3 on "Love in the Valley," the subjects were to decide whether, as a lover, the poet is genteel or clumsy. Their answers as a whole favored "genteel" two to one over "clumsy." However, the "genteel" rating came most heavily (three to one) from subjects who read it in the stiff Futura and Gothic faces, while subjects who read it in the softer, less organized Italic face were divided evenly between "genteel" and "clumsy." The apparent conclusion here is that the typeface influenced interpretation of the poem.

The results on that question were fairly positive; however, the rest show uncommon agreement across the four typefaces, even on questions where the answers were generally divided. This indicates a clear null hypothesis, suggesting that there was no influence of typeface on meaning.

The specific questions would have required a strong influence to show any significant variances, but it is in the nature of semantic differentials to bring out subtler nuances through the adjective profiles they produce.

Semantic differential analysis is done by means of adjective pairs, where subjects indicate their evaluation of the poem on a scale ranging from one pole to the other, as shown in this example:

	1	2	3	4	5	6	7	
SOFT	very soft	soft	more soft than hard	neither hard nor soft	more hard than soft	hard	very hard	HARD

The same questionnaire containing twenty-five adjective pairs was attached to each of the poems in this experiment. Here again, no statistically significant results were reported, thus strengthening the null hypothesis.

This experiment was designed to give every opportunity for typeface to show its effect on interpretation. The poems and typefaces were selected to lead into well established views on atmosphere value. Since practically none of these leads succeeded, the negative results were all the more convincing.

The overwhelming negative results in the central part of this experiment lead to the inescapable conclusion that the atmosphere value of the typefaces contributes little or nothing to the denotative or even the connotative meaning of the text. This contradicts the suggestion that typography can influence the communication of connotative variations in

poetry. Any mood picked up from the typeface must actually be brought to the poem by highly sensitized readers.

IV. Conclusions

The negative results of my research on atmosphere value are disappointing, for they cast doubt on the trend toward emphasizing the visual form of letters, which we had just so clearly identified. Does this now suggest that the Lettrists were over-zealous, the Futurists ill-informed, and Mallarmé misguided? No, we do not need to go that far in the opposite direction. This research serves to establish limits on the claims that can be made for typography, but it does not reduce the importance or the fascination of letters as visual objects.

In a subsequent experiment, using the same poems in their four different typefaces, I asked subjects to classify them according to which typeface seemed most appropriate for each poem. This time there was general support of certain choices: "Love in the Valley," characterized by the semantic differential analysis as sentimental, dreamy, and tender, was matched to the Italic typeface; "It Isn't," whose semantic differential profile stressed the qualities of order and authority, was cast in the Roman typeface. These results coincide with conventional wisdom on the selection of typefaces, where Italic is romantic, and Roman is rational.

Thus, although the poet cannot expect the typographic setting to affect the meaning of his poem, the readers of poetry can still perceive the suitability of the typeface chosen. Mallarmé, Laforgue, and the others display unusual sensitivity to their audience.

For painters, the function of letters remains powerful. Written language in a painting always catches our attention first, and affects the way in which our eyes "read" the composition. But it must be a matter of the general idea of print, rather than the specific letters or words shown, which creates the impact on viewers. We recognize that the painting has words in it, before analyzing the design of the letters of the message written.

The same applies to mixed media on the side of poetry. In the Marinetti parolibero, the important thing is that there are numbers and signs in the composition; we do not have to understand what those numbers mean in order to appreciate their function in introducing technology into the poem.

An important means that continues to be open for painters to contribute to poetry is through the embellishment of poetic compositions. Although we have demonstrated that the visual presentation of poems does not influence their meaning, still we must acknowledge the strong appeal to the senses in texts that are gracefully printed, carefully designed visually, and decorated with illustrations. This trend is evident in illuminated medieval manuscripts, in sumptuous editions such as the volume of Verlaine's Parallèlement illustrated by Pierre Bonnard, and recently in novels such as Willie Masters' Lonesome Wife, by William Gass, and Double or Nothing, by Raymond Federman, which benefit from a variety of contemporary typographic advances for their unusual page design.

The interest of scientists in this field will not diminish, as they continue to offer technological improvements on typeface design, as well

as creative solutions to means of printing and reproduction which allow for far-ranging possibilities. To mention one such innovation, the photographic method of reproduction allows letters and pages to be enlarged, curved, unfocussed, stretched, colored, and distorted in directions that were impossible with conventional type. The computer is also a useful tool for analysis of typeface design, facilitating research that would otherwise have been too painstaking to attempt.

For some scientists, poetry and painting may seem like foreign disciplines, but for others this strangeness can invite a freedom of experimentation that will result in a ludic creativity. The kind of collaboration that existed among Henry, Kahn, and Signac had not only a crisp, stimulating effect on the poet and painter, but also was humanizing in its influence on the scientist.

Finally, let us encourage collaboration not only for the value to poetry and to the individuals involved, but also for the human benefits. I am trying to prevent this paper from reading like an epic novel where the first generation of creative men lived in harmony in the nineteenth century, but whose children, under the cold light of twentieth century research, turn out to have nothing to say to each other. The concluding chapter must point to a future where the differences are not resolved--heaven preserve us from uniculture--but where continuing interaction will promote the human cause.

Davis and Elkins College

1977

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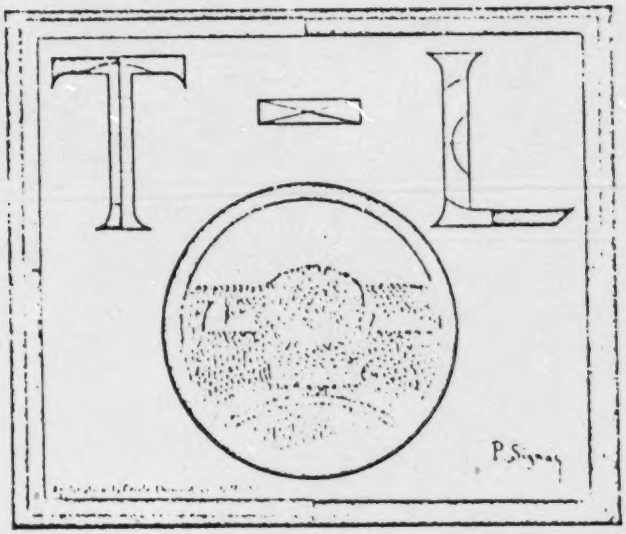

Fig. 3 - Charles Henry & Paul Signac. (Application of Henry's theories by Signac on a program for the Théâtre Libre.)

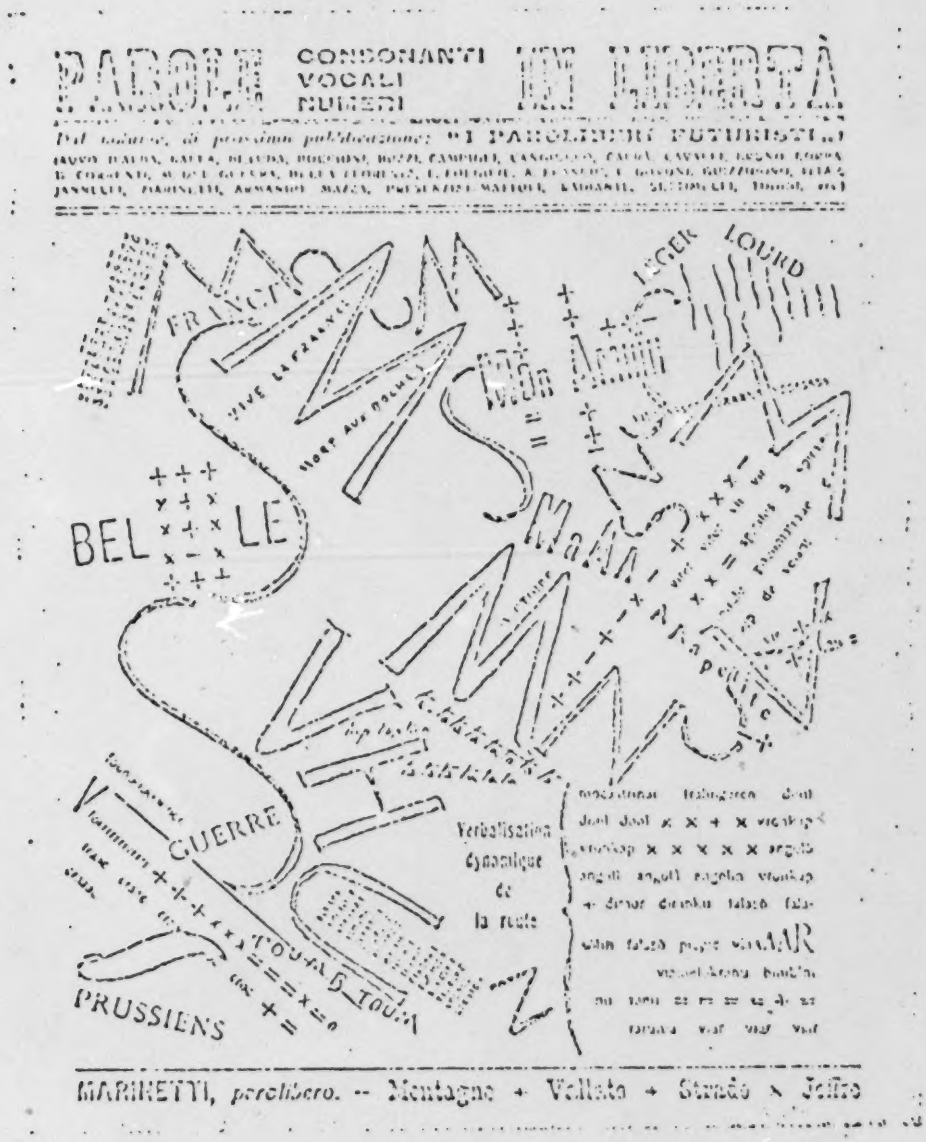

Fig. 4 - Marinetti, "Après la Marne, Joffre visita le front en auto." (Parolibero.)

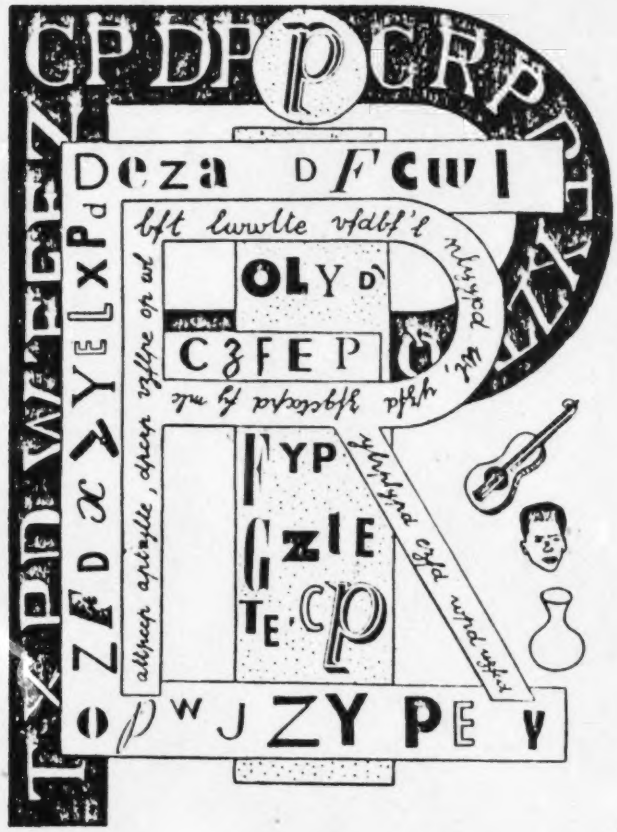

Fig. 5 - Maurice Lemaître, page from Canailles I, a Hypergraphic novel.

Forty years back, when much had place
That since has perished out of mind,
I heard that voice and saw that face.

He spoke as one afoot will wind
A morning horn ere men awake;
His note was trenchant, turning kind.

He was of those whose wit can shake
And riddle to the very core
The counterfeits that Time will break . . .

Of late, when we two met once more,
The luminous countenance and rare
Shone just as forty years before.

So that, when now all tongues declare
His shape unseen by his green hill,
I scarce believe he sits not there.

No matter. Further and further still
Through the world's vaporous vitiate air
His words wing on—as live words will.

Fig. 6 - "George Meredith," by Thomas Hardy. (Printed in Baskerville Roman.)

O World! O Life! O Time!
On whose last steps I climb,
  Trembling at that where I had stood before;
When will return the glory of your prime?
    No more—Oh, never more!

Out of the day and night
A joy has taken flight:
  Fresh spring, and summer, and winter hoar
Move my faint heart with grief, but with delight
    No more—Oh, never more!

Fig. 7 - "A Lament," by Percy Bysshe Shelley. (Printed in News Gothic.)

Under yonder beech-tree single on the green-sward,
Couch'd with her arms behind her golden head,
Knees and tresses folded to slip and ripple idly,
Lies my young love sleeping in the shade.
Had I the heart to slide an arm beneath her,
Press her parting lips as her waist I gather slow,
Waking in amazement she could not but embrace me:
Then would she hold me and never let me go?
Shy as the squirrel and wayward as the swallow,
Swift as the swallow along the river's light
Circleting the surface to meet his mirror'd winglets,
Fleeter she seems in her stay than in her flight.
She as the squirrel that leaps among the pine-tops,
Wayward as the swallow overhead at set of sun,
She whom I love is hard to catch and conquer,
Hard, but O the glory of the winning were she won!

Fig. 8 - "Love in the Valley," by George Meredith. (Printed in DeVinne Italic.)

It isn't the heat;
It's the humidity.
It isn't the cold;
It's the frigidity.
It isn't the bulk;
It's the solidity.
It isn't the grief;
It's the morbidity.

It isn't the speed;
It's the rapidity.
It isn't the greed;
It's the avidity.
It isn't the thaw;
It's the liquidity.
It isn't the law;
It's the juridity.

It isn't the vice;
It's the perfidity.
It isn't the ice;
It's the too-skidity.
It isn't the glue;
It's the viscidity.
It's not even you;
It's my hyperacidity.

Fig. 9 - "It Isn't," by Melville Cane. (Printed in Futura medium condensed.)